Effects of Ultraviolet Radiation on Distribution of the Solitary Ascidian *Ciona savignyi*

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Ultraviolet light may have major effects on the plants and animals living in shallow water marine habitats including fouling communities. Ascidians are major components of fouling communities, and might be affected by UV irradiation. Previous work suggests that the solitary ascidian *Corella inflata* is strongly affected by UV and that its distribution is largely determined by light. *C. inflata* may persist in fouling communities only because it has an unusual reproductive mode that allows it to remain in appropriate (shaded) sites (Bingham and Reyns 1999; Bingham and Reitzal, 2000). The unusual reproductive pattern (brooding) of *C. inflata* makes it an interesting subject for study of UV effects. However, it also may make it a poor model for other ascidians.

Ciona savignyi is a solitary, free-spawning ascidian recently introduced to the Puget Sound, Washington, USA (Cohen and others 1998). I tested the light sensitivity of this species to determine how it survives in fouling environments despite its lack of a brooding mechanism. I sampled field distributions to determine if a relationship exists between light levels, distribution, and health of *C. savignyi* adults. To test their sensitivity to UV, I exposed adults and embryos to natural sunlight that was partitioned by filters into no light, UVA + PAR, and UVB + UVA + PAR. Because eggs and embryos may have UV protection in their vitelline coat or follicle cells, I also demembranated eggs (Byrd and Lambert 2000) and exposed the developing embryos to UV radiation. Finally, I tested body parts of *C. savignyi* to determine if they house UV-screening compounds (Karentz and others 1991).

In the field, no adults were found in sunlight-exposed areas, but population densities were high in shaded areas. In shaded areas there was no relationship between adult length, UV light intensity and depth of the animals. The UV portion of natural light quickly killed adults, but developing embryos reached the tadpole stage with UVB, UVA, and PAR portions of the light spectrum. Demembranated embryos exposed to the full spectrum underwent embryogenesis, suggesting that the embryos have protection from UV radiation. Extracts of the gonads absorbed in the UV range, indicating that they may contain a UV-absorbing compound, but the tunic, eggs and stomach did not. I suggest that *C. savignyi* colonizes docks through UV-protected embryos may either disperse short distances or remain near the adults that spawned them (Svane and Havenhand 1993). Information on the sensitivity, including damage thresholds, of ascidians and other fouling organisms to UV light is needed to understand their ecology and the structuring of the dock community.

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